WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device comprising the steps of:

forming a first insulating film on a semiconductor substrate;

forming a trench portion in said first insulating film;

forming a second insulating film over the entire surface of said semiconductor substrate so as to fill up said trench portion;

forming a plurality of trenches for wiring in an area excluding a region immediately above said trench portion by removing said second insulating film selectively;

forming a metal film so as to fill in said trenches for wiring;

forming a plurality of wirings by removing said metal film lying outside said trenches for wiring;

forming a trench to form an air gap by removing said second insulating film lying above said trench portion, said trench to form an air gap being composed of a removed portion of said second insulating film and said trench portion; and

forming a third insulating film over the entire surface of said semiconductor substrate so as to form a cavity within said trench to form an air gap.

2. The method according to claim1, wherein said step of forming a trench to form an air gap comprises removing said second insulating film throughout the whole region between said adjacent wirings.

3. The method according to claim 1;

wherein said step of forming a trench portion comprises forming a

plurality of via holes together with said trench portion, in a region of said first insulating film other than the region where said trench portion is formed,

said step of forming trenches for wiring comprises connecting said trenches for wiring to said via holes, and

said step of forming a metal film comprises filling it in said via holes along with said trenches for wiring.

4. The method according to claim 1, wherein said step of forming a trench to form an air gap comprises removing said second insulating film along the region where said trench portion is formed.

5. The method according to claim 1, wherein said step of forming a trench to form an air gap comprises removing said second insulating film, by using an etchant capable of removing said insulating film selectively with respect to said metal film without using a mask.

6. The method according to claim 1, wherein said third insulating film is made of a low-dielectric-constant material.

7. A method of manufacturing a semiconductor device comprising the steps of:

forming an insulating film on a semiconductor substrate;

forming a plurality of trenches for wiring by removing said insulating film selectively;

forming a metal film so as to fill in said trenches for wiring;

forming a plurality of wirings by removing said metal film lying outside said trenches for wiring; and

forming a trench by removing said insulating film throughout the whole region between said adjacent wirings.

8. The method according to claim 7, further comprising a step of forming an interlayer insulating film over the entire surface of said semiconductor substrate after step of forming a trench.

9. The method according to claim 8, wherein said step of forming an interlayer insulating film comprises forming a cavity within said trench.

10. The method according to claim 8, wherein said interlayer insulating film is made of a low-dielectric-constant material.

11. The method according to claim 7, wherein said step of forming a trench comprises removing said insulating film by using an etchant capable of removing said insulating film selectively with respect to said metal film without using a mask.